With regard to the § 102 rejection, the Office Action states:

> Langford-Smith discloses the audio transformer which naturally will generate harmonic contents. See p. 207 specifically. Although not explicitly shown, an audio source is inherently connected to the transformer."

It is respectfully requested that the Examiner clarify the meaning of the statement that an audio transformer will naturally "generate harmonic content". It is assumed that this statement refers to the fact that no audio transformer is perfect and that some distortion is unavoidable. While audio transformers do exhibit some natural distortion, neither Langford-Smith nor any other prior art reference cited in this case discloses, teaches or suggests that it is desirable to design an audio transformer to include any amount of distortion. On the contrary, the prior art teaches that in designing audio transformers, the person of ordinary skill would strive to eliminate, or at least minimize as much as possible, distortion in the audio transformer. See, for example, pages 206 and 211 of Langford-Smith where it is taught that minimizing distortion in audio transformers is an important design concern. In particular, see pg. 206 where it is stated:

> For design purposes it is necessary to know ... (3) Permissible distortion, at specified operating levels and frequencies, ...

In addition see pg. 211, lines 9-11 where Langford-Smith states:

> The frequency response must not fall more than 1db below mid-frequency response, at 50 c/s. Distortion must not exceed 1% at zero level at 50 c/s.

As a further example that the art teaches to minimize distortion, see column 3, lines 32-36 of Kurtin et al. (4,275,267) where it is stated:

> The audio signals are applied to the primaries of the isolation transformers through the voltage dividers 26 ad 27 which present a low impedance source for driving the transformers 26' and 27' at low distortion and with a wide band width. (Emphasis Added)

The transformers discussed on page 207 of Langford-Smith are classical audio transformers (see lines 5-7 under "**Frequency response**"). Such transformers are designed to uniformly amplify (i.e., step-up transformer), uniformly attenuate (i.e., step-down transformer) or

isolate (i.e., one-to-one transformer) the audio signal across its frequency bandwidth. In practice, classical audio transformers have a generally flat frequency response, over the band of interest, that falls off at the low end and the high end of the frequency bandwidth. The band of interest is typically narrower than the overall bandwidth of the audio signal. A flat frequency response refers to the frequency components of the audio signal, transmitted through the audio transformer, being amplified uniformly (i.e., the same amount). The falling off at the low end and high end is an undesirable distortion.

Uniformly amplifying the frequency components of an audio signal does not improve the harmonic quality of the audible sound reproduced from that signal, it simply increases the decibel level (i.e., volume) of the sound, resulting in the same sound but louder. Similarly, uniformly attenuating the frequency components of an audio signal does not improve the harmonic quality of the audible sound reproduced from the signal, it simply decreases the decibel level (i.e., volume) of the sound, resulting in the same sound but quieter. Typically the flat mid-band of the response extends over a range of frequencies that depend upon the application of the transformer. This range is likely to be from about 20 Hz to 20 kHz for an audio transformer and it may be about 300 Hz to about 3000 Hz for a telephone line transformer. Because distortion in audio transformers (i.e., the falling off at the low and high ends) is to be avoided, it is desirable for the distortion at the ends of the desired flat frequency response to mostly occur at frequencies outside of the range of normal human hearing (e.g., see the last three lines on page 209 of Langford-Smith). This is an intentional design choice to, in effect, remove the distortion from what the listener would hear.

In contrast to the teachings of the cited art, the present invention is intended to distort an input audio signal into an enhanced audio signal by distorting audible frequency components of the audio signal so that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality compared to audible sound reproduced from the input audio signal. The claims have been amended to more clearly recite this distinction.

With regard to the § 103 rejection of claims 2, 3, 5 and 6, the Office Action states:

> ...it is well known to those in the art that the specific response of an audio transformer and the amplification factor are determined by the designing factor and the components being used. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the system as disclosed in Langford-Smith by having frequency response peak at the range from 6 kHz to 30 kHz because it was considered as a matter of engineering design choice to design the performance of the transformer according to its application.

Claim 2 recites that the claim 1 high frequency is a peak high frequency in the range of from about 6 KHz to about 30 KHz, and claim 5 recites that the claim 4 low frequency is a peak low frequency in the range of from about 20 Hz to about 1.0 KHz. It is submitted that while the performance of a classical audio transformer is a matter of engineering design choice, designing a flat response audio transformer so as to have a peak high frequency or a peak low frequency in the claimed range would result in far too much distortion to be acceptable to the person of ordinary skill in the art. With regard to claims 3 and 6, reference is made to the above remarks.

With regard to the § 103 rejections of claims 10, 11 and 17, the Office Action states:

> ... it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the system of Langford-Smith by using two transformer to processing stereo signals with two separate channels.

Claims 10, 11 and 17 stand further rejected under § 103 as being unpatentable over Kurtin et al. in view of Langford-Smith. Concerning this rejection, the Office Action states:

> Kurtin discloses a stereo audio system with two audio transformers ***. However, Kurtin fails to show the frequency characteristic of the transformers. It was well known in the art that the transformer is not a linear device. As discussed in Langford-Smith, each audio transformer has its own characteristic depending on the design components. Thus, it would have been obvious *** to modify the system of Kurtin by incorporating the teachings regarding the transformer as

disclosed in Langford-Smith in order to design the transformers to be able to perform the function as intended.

It is respectfully submitted that the above recited basis for these § 103 rejections indicates that the Examiner misunderstands the invention recited in claims 10, 11 and 17. Langford-Smith only disclose single audio transformers. Kurtin et al. expressly discloses that each of their two audio transformers 26' and 27' is used to process audio signals passing through a single channel (see Fig. 1 and col. 3, lines 29-44). Claims 10, 11 and 17 each recite that the passive circuit comprises two transformers that effect the distortion of the input audio signal, as defined by a first portion and a second portion of a frequency response curve. Nowhere in the claims is it stated that only one of the two recited transformers is used to process a single input signal. The two transformers of claims 10, 11 and 17 are recited as together producing the claimed frequency response curve. For a stereo system, the invention of claims 10, 11 or 17 (i.e., both transformers) would be used to process audio signals passing through a single channel. Neither Langford-Smith nor Kurtin et al., singly or together, disclose, teach or suggest such a two transformer system. Both of these references only disclose the use of a single transformer to process an audio signal.

Furthermore, both Langford-Smith and Kurtin et al. also fail to disclose, teach or suggest the modification set out in the Office Action as neither document discloses, teaches or suggests providing first and second transformers for effecting the particular frequency response recited in claims 10, 11 or 17.

Therefore, it is submitted that Kurtin et al. and Langford-Smith, whether taken singly or in combination, do not teach or suggest the subject matter set out in claims 10, 11 and 17. Accordingly, it is submitted that for the above reasons claims 1, 12 and 18, and dependent claims 2-11, 13-17, and 19-23 are not anticipated by or obvious in view of Langford-Smith.

With this response, new claims 24-35 have been added to the present application. It is submitted that no new matter is being added with these claims. It is further submitted that these claims define patentable invention over the prior art.

It is also submitted that there are limitations recited in the pending claims, in addition to those discussed above, that further distinguish the claimed invention patentably from Langford-Smith and the other art of record. Accordingly, it is submitted that the § 102 and § 103 rejections should be withdrawn.

In view of the above remarks and amendments, applicants submit that claims 1-35 define patentably over the prior art. Early notification of allowable subject matter is respectfully requested.

Respectfully submitted,

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